بسم الله الرحمن الرحيم

Anatomy Of The Female Genital System :عنوان المحاضرة

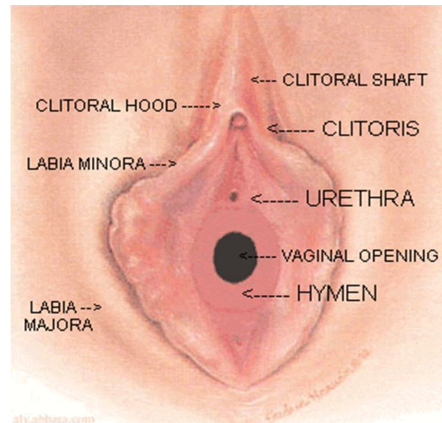
تاريخ المحاضرة : 17/1/2013

المحاضر : د. هيثم بهاء

A-The Vulva

1. Mons pubis:

a pad of fat overlying the symphysis pubis and covered by skin & hairs (in female ends by straight line while in male., triangle extending toward umbilicus).



2. Clitoris: **Circumcision ده اللي بيتقطع خلال الـ**

- **An erectile cavernous structure below the symphysis pubis.**
- **Formed of a small glans and two corpora cavernosa.**
- **The most sensitive part. Very rich in nerve endings**

3. Labia Majora: الشفرة الكبرى

The outer 2 skin folds, raised by underlying fat, and passing back from the mons pubis to the perineum where the Rt and Lt fuse together forming the Posterior Commissure. The outer skin is covered by hairs while the inner medial surface is smooth, hairless and contains sebaceous and sweat glands

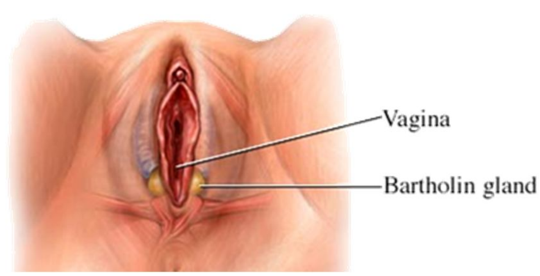
4. Labia Minora: الشفرة الصغرى

2 thin folds of modified skin situated medial to the labia majora, hairless, start at the end of clitoris, fuse posteriorly with each other to form fourchette.

5. The Hymen: غشاء البكارة

- **A membrane, demarcates the external from the internal genital organs, and partially closes the vaginal orifice. There is an opening allow passage of menses before marriage.**
- **Covered by stratified squamous epithelium**
- **Torn in the 1st sexual intercourse unless being elastic. غشاء البكارة مطاطي**

6. Bartholin Glands: (Greater Vestibular Glands):



- **Bilateral compound racemose glands**
- **Secrete mucus (Lubricant) during sexual excitement**
- **Situated deep in the labia majora, at the junction of the posterior and the middle thirds**
- **Its duct is 2 cm long and opens between the hymen and the labium minus.**

7. Vestibule:

The areaالفراغ between the inner aspects of the labia minora and the fourchette.

Structures that open in the vestibule are: (Urethra - The Bartholin glands ducts - The vagina)

8. Vestibular bulbs:

oblong masses of erectile tissue that lie on each side of the vaginal introitus

9. External urethral meatus:

A triangular slit in the anterior part of the vestibule below the clitoris in which the urethra opens.

Applied Anatomy:

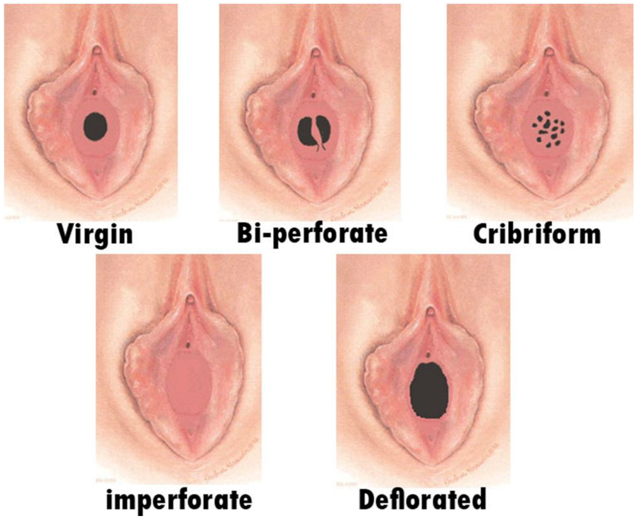
– الClitorisهو الجزء اللي بيتشال في عملية الCircumcision ودي عملية ممنوعة

– أعرف مكان الBartholin Gland علشان لو حصل فيها cyst or abscess ، وإزالة الGland يعمل painful Intercourse نتيجة ال dryness

– أنواع ال Hymen : ◄◄◄

– البنت اللي عندها Imperforate Hymen هتشتكي بـ Amenorrhea رغم ظهور كل الSexual Characters ويجيلها كل شهر في معاد الدورة Cyclic Menstrual-Like Period ، لازم يتعملها Incision ، دي اللي بنسميها (الدورة المخزنة)

– يظل فيه remnant من ال Hymen بعد الDefloration مبينزلش إلا مع أول ولادة



Blood Supply

Arterial Supply:

- Internal pudendal artery: The terminal branch of the anterior division of the internal iliac artery that ends as the dorsal artery of the clitoris.
- Superficial and deep external pudendal arteries branches from the femoral artery.

Venous Drainage:

The veins draining the vulva form a venous plexus from which veins accompany their corresponding arteries. The veins draining the clitoris join vaginal and vesical venous plexuses.

Lymphatic Drainage of the vulva

- The superficial inguinal lymph nodes, to the deep inguinal and femoral lymph nodes of which the lymph node of Cloquet drains the clitoris directly.
- From the former superficial group, lymphatic channels pass to the deep pelvic nodes including; the external iliac, common iliac, then para-aortic lymph nodes.

– الClitoris والMid-Line Structures بيبعتوا علطول على الDeep ودي مشكلتها في الMetastasis بتاع الTumors

Nerve Supply of the vulva

The vulva is supplied mainly from the pudendal nerve (S 2, 3 & 4).

Additional sensory nerves are supplied from; the Ilio-inguinal nerve (L1), the genital branch of genito-femoral nerve (L 1,2), and the posterior cutaneous nerve of the thigh.

B)The Vagina

A fibromuscular tube from the vulva to the uterus forming an angle of 60° with the horizontal plane.

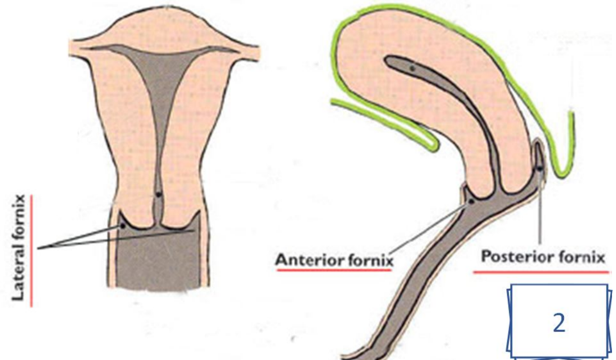
Length:

Anterior wall is 8-9 cm - Posterior wall is 10 -11 cm

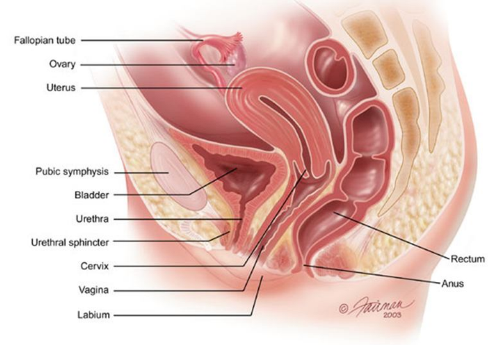
– الAnterior أقصر علشان الCervix عمل Invagination فيه

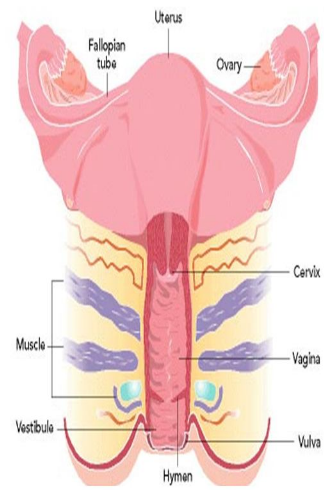
Vaginal Fornices:

The cervix projects in the upper blind end of the vagina that forms a pouch (vaginal pouch) around the cervix and is divided into four fornices : two lateral, anterior and posterior (deeper) fornices.



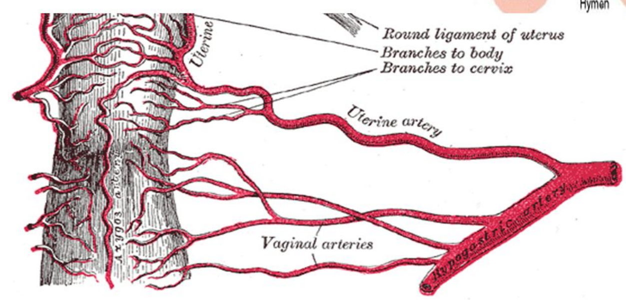
Anatomical Relations of the Vagina





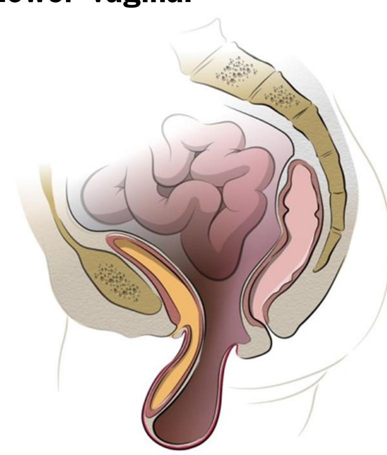
Anteriorly:
Upper 1/3: trigone of urinary bladder
Lower 2/3: urethra.
Posteriorly:
Upper 1/3: peritoneum of Douglas pouch.
Middle 1/3: ampulla of rectum.
Lower 1/3: the perineal body.
Laterally:
Lower end: Bulbocavernosus muscle, vestibular bulb, and Bartholin gland.
1 cm above orifice: urogenital diaphragm
2½ cm above the orifice: levator ani muscle with the pelvic fascia above it.
The lateral fornix gives attachment, to the lower part of the cardinal ligaments.
The ureters pass through the cardinal ligaments 1 cm lateral to the vagina

Blood Supply



Arterial supply:
***The vaginal artery (from internal iliac artery)**
Additional branches from:
***Middle rectal artery (from internal iliac artery)**
***Inferior rectal artery (from the internal pudendal artery, of the internal iliac artery)**
Venous drainage:
A plexus around the vagina (the vaginal plexus), drain into the internal iliac vein by veins that accompany their corresponding arteries.
Lymphatic drainage of the vagina
lower 1/3 drains to the inguinal lymph nodes, like vulva
upper 2/3 follows lymphatic drainage of the cervix,
Nerve supply of the vagina: The pudendal nerve gives sensory fibers to the lower vagina.

Applied Anatomy



Vaginal Prolapse: الست تقول أنا نازللي سقف البدن (سقوط رحمي)
Weakness of the vaginal supports (ligaments, fascia and muscles) may lead to:
***descent of anterior vaginal wall (cystocele or urethrocele),**
If Both descend → Cysto-Urethroceleده بيحصل في الولادة بالذات خارج المستشفيات
***descent of posterior vaginal wall (rectocele or enterocele), or**
***descent of the vaginal vault after hysterectomy (vault prolapse).**
The posterior fornix:
Offers a passage to the pouch of Douglas for performing culdoscopy, culdocentesis and for drainage of a pelvic abscess

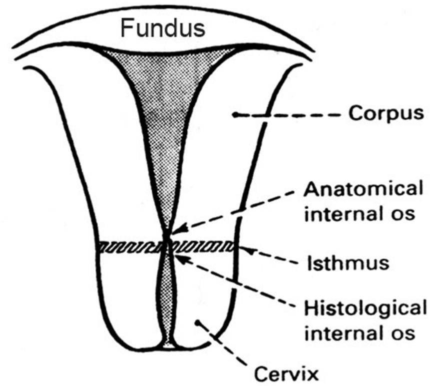
– المريضة عندها تجمع ورا الـ**Vagina** وأنا عايز أعرف هو إيه بدخل بإبرة لو دم افتح أما لو طلع **Serous fluid** ادي **Antibiotic**

The lateral fornix:
The ureter lies 1-2 cm lateral to it so that it may be injured during clamping the angle of the vagina in hysterectomy operation

– خد بالك وانت بتعمل عملية الـ**Hysterectomy** متآخدش الغرزة **Lateral** جامد علشان متربطش الـ**Ureter** غلط ، تدخل المريضة في مشاكل وهتحتاج عملية تاني

The Uterus

- **A pear shaped hollow muscular organ**
- **Measuring around 7.5 x 4.0 x 2.5 cm in the longitudinal, transverse, and anteroposterior diameters.**
- **It is slightly larger in the multipara than in the nullipara.**



Divisions

1. The Corpus Uteri:

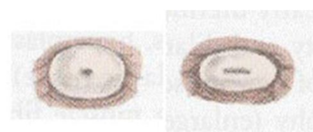
Body that lies above the internal os
Cornu = the area of insertion of the fallopian tubes
Fundus lies above the insertion of the tubes.
Three structures are attached to the cornu:
Round ligament anteriorly, Fallopian tube centrally, Ovarian ligament posteriorly

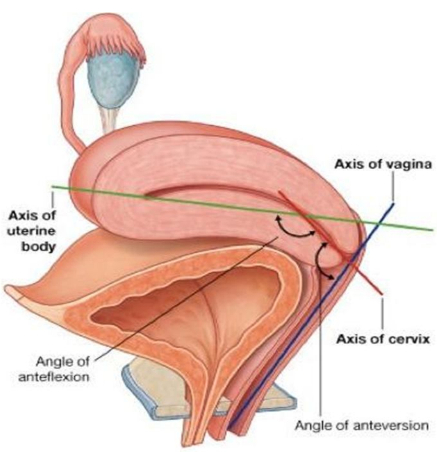
2. The isthmus:

- **An area 4-5 mm in length that lies between the *anatomical internal os* above, and the *histological internal* os (where mucosa changes from Cuboidal Epithelium of the Uterus to the Columnar epithelium of the Cervix) below.**
- **It is lined by low columnar epithelium and few glands.**
- **The isthmus expands during pregnancy forming the lower uterine segment (10 cm) during the last trimester.**

3. The cervix:

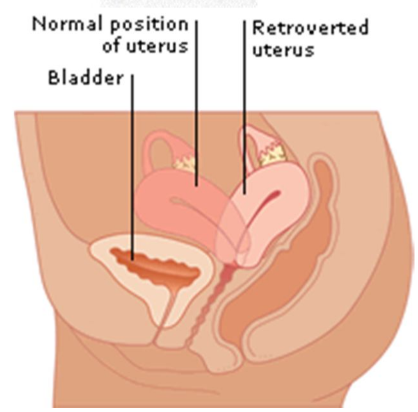
The elongated lower part of the uterus Measuring 2.5-3.0 cm.
Divided by the vaginal attachment into:
***Supravaginal portion above　　　*Vaginal portion (portio-vaginalis) below.**
The cervical canal is the cavity that communicates above with the uterine cavity at the internal os and below with the vagina at the external os.
The external os is round in nulliparas and slit shaped in multiparas





Position:

The uterus is kept in an ANTEVERTED ANTEFLEXED POSITION (AVF), with the external os lying at the level of the ischial spines, by the support of the cervical ligaments, endopelvic fascia and pelvic floor muscles (levator ani).
***Anteversion: The uterus is inclined anteriorly to axis of the vagina.**
***Anteflexion: The body of the uterus is bent forwards upon the cervix.**



–فايدة الوضع ده إنه يحمي الUterus من زيادة الIntra-Abdominal Pressure فيمنع إنه يحصله Prolapse ، لو الUterus بقى Retroverted يتكون الست أكتر عرضة للProlapse

Relations of the Body of the Uterus

Anteriorly: The bladder and vesicouterine pouch.
Posteriorly: The pouch of Douglas.
Laterally: The broad ligament on each side.

– الـ Vesico-Uterine Pouch هو الـRecess من الـPeritoneum اللي داخل بين الـUterus والـBladder وهو اللي بدخل منه في الـCesarean Section علشان أولد الطفل

Histology of the Uterus

Three layers: 1. Endometrium: (mucosa) 2. Myometrium (musculosa)
3. The peritoneal covering or perimetrium

1-Endometrium:

- **Lined by simple cubical or columnar epithelium**
- **Contains tubular glands. (Give nutrition to embryo before Implantation)**
- **Shows cyclic changes with the menstrual cycle under the influence of ovarian hormones**

2- Myometrium

Three layers :

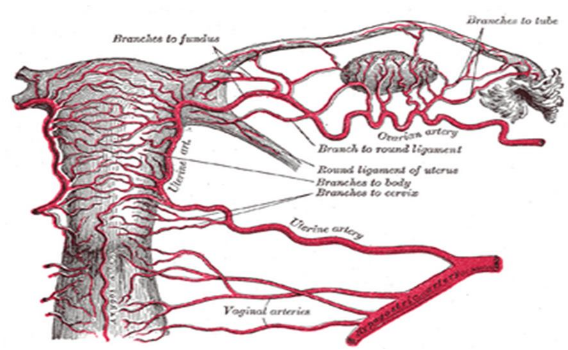
- **Outer longitudinal muscle layer**
- **Middle layer of interlacing criss-cross muscle fibers surrounding the blood vessels**
- **Inner circular muscle layer**

– وضع العضلات بالشكل ده علشان لما يحصل الـUterine Contraction خلال الـDelivery يقفلوا على الـBlood Vessels اللي وسطيهم ويوقفوا النزيف ، بنسميها غرزة الحياة Living Suture

Blood Supply

Arterial supply: THE UTERINE ARTERIES
Arise from the anterior division of internal iliac artery.
2 branches: *An ascending *A descending branch

–بيعمل anastomosis مع الـOvarian Artery علشان كده لو قفلت الـ Uterine artery مش بيحصل Ischemia



Venous drainage:

Starts as a plexus between the 2 layers of the broad ligament (Pampiniform plexus) that communicate with the vesical plexus and drains into the uterine and ovarian veins.

Lymphatic drainage:

Fundus: To the para-aortic lymph nodes via ovarian vessels.
Cornu: To the superficial inguinal lymph nodes via lymphatics of the round ligament.
Body: To the internal then external iliac lymph nodes via the uterine vessels.
Cervix: Two groups of lymphatics:

- **Primary groups: Paracervical, parametrial, obturator, internal and external iliac nodes.**
- **Secondary groups: Common iliac, para-aortic, and lateral sacral lymph nodes.**

Nerve supply of the Uterus

The cervix and body are relatively insensitive to touch, cutting and burning.
The cervix is sensitive to dilatation and the body is sensitive to distension.

– علشان كده عملية كي عنق الرحم ممكن تتعمل من غير Anesthesia والمريضة متحسش غير لما يحصل Cervix dilatation أو الUterus يحصله Distention

Innervations

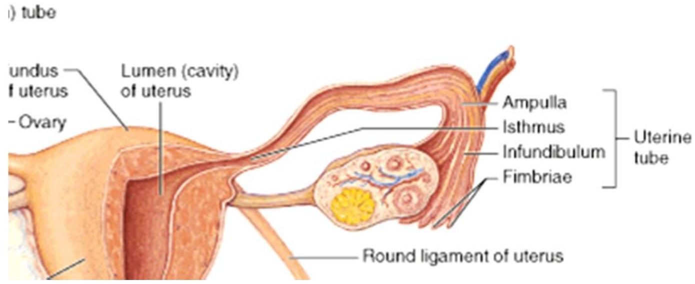
Parasympathetic form S2,3,4
Sympathetic from: T5 and T6 (motor) T10, T11, T12, and L1 (sensory).
Both reach the uterus through branches of inferior hypogastric plexus.

The Fallopian Tube: أنبوبة الرحم

٢ tortuous tubes (10 cm in length) lie in the free upper part of the broad ligament.

4 parts:

1. **Interstitial part (1 cm):** pierces the uterine wall, very narrow, no peritoneal covering, no outer longitudinal muscles.
2- **Isthmus (2 cm):** straight, narrow, thick walled portion lateral to uterus.
3. **Ampulla (5 cm):** the widest, tortuous, thin walled outer part. WHERE FERTILIZATION OCCURS
4. **Infundibulum (2 cm):** trumpet shaped outer end opens into the peritoneal cavity by the tubal ostium. The ostuim is surrounded by fimbriae, one of which is long and directed towards the ovary (fimbria ovarica).



Tubal functions

- Ovum Pick Up, at the time of ovulation, by their free fimbrial end,
- Transport Of The Ova through the tubal lumen, by their peristaltic and ciliary movements, and
- Production Of Secretions necessary for capacitation of the sperm and nutrition of the ova during their journey, by their lining cells

– لو الـCilia مبتتحركش لأي سبب زي الـInfection مثلاً ده ممكن يعمل Ectopic Pregnancy حمل خارج الرحم

Blood Supply

Arterial supply: branches from both the uterine artery, and the ovarian artery.
Venous drainage:
Right ovarian vein drains directly into the IVC, Left ovarian vein drains into the left renal vein.
Lymphatic drainage: para-aortic LNs directly via ovarian lymphatics.
Nerve supply: sympathetic and parasympathetic fibers

Applied anatomy

Tubal pain is referred to the tubal points (On the lower abdominal wall 1/2 an inch above the midinguinal points

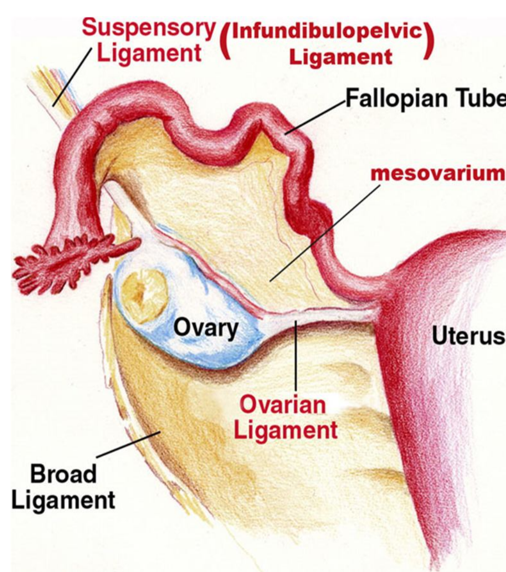
– علشان كده الألم بتاع الـEctopic Pregnancy ممكن يتشابه مع الـAppendicitis

---

The Ovary

*Almond shaped *Measuring 3 x 2 x 1 cm.
*Not covered by peritoneum (to permit ova passage to the Fallopian Tube)
*Three attachments:

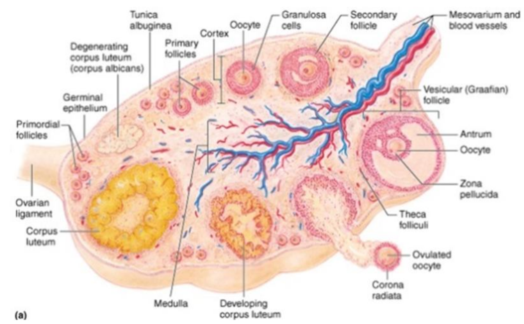
- **The mesovarium:** A peritoneal fold that suspends the ovary to the back of the broad ligament.
- **The infundibulopelvic ligament**: suspends the upper pole of the ovary to the lateral pelvic wall and carries the ovarian vessels, nerves and lymphatics.
- **The ovarian ligament**: attaches the lower pole to the cornu of the uterus.



Histology of the Ovary

The ovary is subdivided into; Cortex, Medulla.

The Medulla: The central core of the ovary surrounded by the cortex and continuous with the hilum. It is formed of connective tissue.



The Cortex: هو المهم

The outer active part of the ovary that produces hormones and oocytes.

Blood Supply

Arterial supply:

***Ovarian artery*: Arises from the aorta at the level of L2 and passes through the infundibulopelvic ligament.**

***Ovarian branch from the uterine artery*; which anastomose with the ovarian vessels at the broad ligament.**

Venous drainage:

The ovarian veins accompany the arterial supply, and join with the pampiniform plexus of veins and the uterine vein. *Left ovarian Vein ends in Lt Renal Vein

---

Pelvic Part of the Ureter: مهم جداً إنك تآخد بالك منه وانت بتعمل جراحة

- **It runs retroperitoneally from the kidney to the urinary bladder.**
- **At the pelvic inlet: The ureter enters the pelvis above the bifurcation of the common iliac artery anterior to the sacroiliac joint.**
- **In the pelvis: It runs downwards lying in front of the internal iliac artery.**
- **At the base of the broad ligament it runs medially and forwards through the parameterium till it reaches about 1 cm lateral to the supravaginal cervix where it passes below and at right angle to the uterine artery.**
- **The ureter then passes forwards through the ureteric canal in the upper part of the cardinal ligament, closely related to the lateral vaginal fornix, to enter the trigone of the urinary bladder.**

Applied anatomy – Ureteric injuries:

During Hysterectomy the ureter may be injured at the following sites:

- **During clamping of the infundibulopelvic ligament as it passes below the ovarian vessels in the lateral pelvic wall.**
- **During clamping of the uterine arteries as it passes below the uterine artery 1 cm lateral to the cervix.**
- **During clamping the vaginal angles and the parametrium 1.0 cm lateral to vaginal vault.**

